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1. (Currently Amended) A method of measuring ~~a material~~ a nuclear size in tissue comprising :
 - irradiating a region of interest in the material tissue with spatially coherent light having a first beam with a first wavelength and a second beam with a second wavelength;
 - directing reference light having the first wavelength and the second wavelength along an optical path having a variable path length;
 - detecting scattered light from the material in response to the irradiating light and detecting the reference light while varying the path length; and
 - generating a heterodyne signal from the detected scattered light and the detected reference light; and
 - determining a size of a cell nucleus within the tissue using the heterodyne signal.
2. (Original) The method of Claim 1 further comprising forming an image of the region of interest.
3. (Currently Amended) The method of Claim 1 further comprising measuring a size of material a plurality of different nuclei within a region of tissue.
4. (Original) The method of Claim 1 wherein the first beam and the second beam irradiate a focal area within the region of interest.

5. (Currently Amended) The method of Claim 1 further comprising measuring the ~~material~~ tissue at a plurality of first and second wavelengths.
6. (Original) The method of Claim 1 further comprising combining scattered light and the reference light and subsequently detecting the combined light.
7. (Original) The method of Claim 1 further comprising measuring a refractive index of a material within a region of tissue.
8. (Original) The method of Claim 1 further comprising recording data in electronic memory and comparing the data to reference data.
9. (Original) The method of Claim 1 further comprising using a fiber optic device to transmit light.
10. (Original) The method of Claim 1 further comprising using a low coherence light source.
11. (Original) The method of Claim 1 further comprising detecting backscattered light from a region of interest.
12. (Currently Amended) The method of Claim 1 further comprising adjusting a depth within the ~~material~~ tissue being measured.
13. (Original) The method of Claim 1 further comprising aligning the first beam and the second beam to overlap at the region of interest.
14. (Currently Amended) An optical system for measuring a ~~material~~ nuclear size in tissue comprising :
a light source and an optical system that irradiates a region of interest in a

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material tissue with spatially coherent light having a first beam with a first wavelength and a second beam with a second wavelength that is harmonically related to the first wavelength;

a reference light beam having the first wavelength and the second wavelength along an optical path having a variable path length;

an actuator that adjusts the variable path length;

a detector system that detects scattered light from the material in response to the irradiating light and detects the reference light while varying the path length, the detector system generating a heterodyne signal from the detected scattered light and the detected reference light; and

a computer programmed to determine a size of cell nuclei in the tissue from the heterodyne signal.

15. (Currently Amended) The system of Claim 14 further comprising a scanning assembly that scans the first beam and the second beam across the material tissue such that an image of the region of interest.
16. (Original) The system of Claim 14 further comprising a data processor that computes a size of size tissue structure within the region of interest.
17. (Original) The system of Claim 14 wherein the first beam and the second beam irradiate a focal area within the region of interest.
18. (Original) The system of Claim 14 further comprising a light source emitting a plurality of first and second wavelengths.
19. (Original) The system of Claim 14 wherein the light source comprises a laser system that generates first and second wavelengths.
20. (Original) The system of Claim 14 further comprising a fiberoptic probe.

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21. (Original) The system of Claim 14 wherein the light source comprises a wavelength tunable laser.
22. (Currently Amended) The system of Claim 14 further comprising a scanner that alters a beam path through the material tissue.
23. (Currently Amended) The system of Claim 22 wherein the scanner alters an angle of the beam path relative to the material tissue.
24. (Original) The system of Claim 14 further comprising a time correlation system.
25. (Original) The system of Claim 14 further comprising a fiber optic fiber optic coupler and an interferometer.
26. (Original) The system of Claim 16 wherein the structure comprises a cell or a cell nucleus.
27. (Original) The system of Claim 14 further comprising a computer having a memory with stored reference data.

Cancelled claims 28-40